34. (currently amended) A mannanase-substrate complex comprising ~~an isolated polypeptide molecule comprising a nucleic acid sequence encoding a heterologous protein in frame with the polypeptide molecule of SEQ ID NO: 2~~ a fusion protein of claim 28 bound to hemicellulose.

35-42. (previously cancelled)

43. (currently amended) A composition comprising a carrier and a fusion protein of claim 28. ~~polypeptide molecule comprising a nucleic acid sequence encoding a heterologous protein in frame with the polypeptide molecule of SEQ ID NO: 2.~~

44. (original) A composition comprising the polypeptide molecule of claim 26 and a carrier.

45-62. (previously cancelled)

63. (currently amended) A method for reducing hemicellulose in a starting material, the method comprising:

administering to the starting material an effective amount of a polypeptide molecule of claim 26 or a fusion protein of claim 28. ~~an isolated polynucleotide molecule comprising a nucleic acid sequence encoding a heterologous protein in frame with the polypeptide molecule of SEQ ID NO: 2.~~

REMARKS

Claims 1-13, 26-34, 43, 44 and 63 are pending in the application. Claims 1-5, 26, 27, 31, 34, 43, and 63 have been amended. Claim 13 has been cancelled.

Claim Objections:

Claims 4 and 5 are objected under 37 C.F.R. 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependant claim. Claims 3, 4 and 5 have been amended to overcome the objection. Support for such amendment can be found in the original claims.

Claim 1, 3 and 6 are objected to because the claims recite an abbreviation "GH5" without providing respective explanations. Claim 1 has been amended to add "glycoside hydrolase family 5" along with the abbreviation GH5. Support for such amendment can be found in the specification at page 4, line 3, and page 15, lines 15-30. The amendment to claim 1 provides a proper unabbreviated antecedent for GH5 in claims 3 and 6.

Claim 31 is objected because it recites an abbreviation "GST" in the claim without providing explanation. Claim 31 has been amended to recite the full name for GST," gene specific tag," in the claim.

Rejections under 35 U.S.C. §101:

The Examiner has rejected claims 10-11 as directed to non-statutory subject matter because claims 10-11 claim "a mannanase A peptide" which reads on a product of nature. The Examiner has further suggested adding terms such as "an isolated or purified" would overcome the rejection. Claims 10 and 11 have been amended accordingly to add "purified" into the claims.

Rejections under 35 U.S.C. §112, the second paragraph:

The Examiner has rejected claim 1, and dependant claims 2-9, 12-13 because claim 1 recites the phrase "a substantially purified" which was not defined in the specification. The Examiner has further suggested deleting the term "substantially" would overcome this rejection. Claim 1 has been amended accordingly. The specification defines the term "purified" on page 12 beginning at line 14.

The Examiner has rejected claim 3 because the limitation 'first catalytic domain' has an insufficient antecedent basis because claim 1 does not recite a "first" catalytic

domain. Claim 3 has been amended to delete the term "first." The amended limitation "catalytic domain" has a sufficient antecedent basis in claim 1.

Claim 9 has been amended to clarify that all of the sequences are present. in combination.

Claim 11 is drawn to a mannose peptide defined as having a sequence of SEQ ID NO: 2. The Examiner has rejected claim 11 because it is not clear to the Examiner whether applicants are claiming a polynucleotide encoding a mannanase or a mannanase polypeptide, as SEQ ID NO:2 is a polynucleotide sequence. Applicants submit that claim 11 claims a mannose peptide having its encoding nucleic acid sequence of SEQ ID NO:2, and amendment to claim 11 has been accordingly made.

The Examiner has rejected claims 12 and 13 because it is not clear to the Examiner as what applicants mean by the phrase "an industrial mixture." The Examiner has further suggested that amending the phrase to "an industrial detergent mixture" would overcome this rejection. Claim 12 has been amended accordingly to claim "an industrial detergent mixture."

The Examiner has rejected claim 26 and dependant claims 27-33 because it is not clear to the Examiner whether applicants are claiming polypeptide comprising each of the SEQ ID NO separately or whether they are claiming a single polypeptide comprising all the SEQ ID NOs. Claim 26 has been amended to more particularly claim the polypeptide. Support for the amendment can be found at least in the specification page 4, lines 3-16; page 17, line 27 to page 19, line 20.

The Examiner has rejected claim 34 as being unclear whether applicants are claiming a nucleic acid molecule or a complex of mannanase bound to hemi cellulose or a fusion protein. Claim 34 has been amended to more particularly claim the composition. Support for such amendment can be found at least in claim 28, specification at page 20, line 4-20 and page.

The Examiner has rejected claim 43 as being unclear whether applicants are claiming a nucleic acid molecule, a polynucleotide or a fusion protein. Claim 43 has been amended to more particularly claim the composition. Support for such amendment

can be found at least in claim 28, specification at page 20, line 4-20 and page 26, line 14 to page 27, line 5.

The Examiner has rejected claim 63 as being unclear to the Examiner what the method is. Claim 63 has been amended to more particularly claim the method. Support for such amendment can be found at least in claim 28, specification at page 20, line 4-20 and page 30, line 26 to page 31, line 10.

The foregoing amendments address and overcome each of the §112 first paragraph rejections made by the Examiner. Applicants' attorney respectfully requests withdrawal of the rejections.

Rejections under 35 U.S.C. §112, the first paragraph:

The Examiner has also rejected claims 1-5, 12-13 under 35 U.S.C. 112, first paragraph, citing that the specification does not reasonably provide enablement for the claims. The Examiner has indicated that the specification does not provide enablement for a composition comprising any and all mannanase A, a carbohydrate binding domain III, a carbohydrate binding domain II from any or all sources. We respectfully traverse the rejection for the following reasons.

It is simply not true that the disclosure fails to contain an enabling disclosure for GH5, CBDII, and CBDIII. These are terms of art that are well documented, known and understood to be family domain categories. The attached excerpt from CAZy, together with the accompanying Rule 132 Declaration from Dr. Ding, shows that the nomenclature GH5, CBDII and CBDIII are well-documented domain families. Those skilled in the art understand and appreciate that there are a variety of sequences characterized in these families. Furthermore, such techniques as screening, hybridization, purification, transcription and translation are well-known in molecular biosciences associated with isolating certain proteins from different sources. Given the detailed molecular information as provided by the specification, it would not require undue experimentation to isolate known genes and protein(s) from other sources known in the art for assemblage in the specific order recited in claim 1.

The Examiner has also taken the position that claims 1-5, 12-13 are as broad as to encompass any mannanase or any carbohydrate binding domains including variants, mutants and recombinants, and thus the specification does not enabling such broad claims. Applicants respectfully disagree.

Claim 1 recites a composition comprising a purified mannanase A peptide comprising a GH5 domain, a carbohydrate binding domain III, and a carbohydrate binding domain II in that specific order. Given the level of knowledge and skill in the art, which at least includes widespread knowledge of the GH5, CBDIII and CBDII families, it is not necessary to provide an exhaustive listing of all CBDIII and CBDII domains. In this art, mere reference to the families is sufficient to identify the families because they are so very well understood. We submit that the rejection of dependant claims 2-5, and 12 are in error for the same reasons as discussed above.

The Examiner has rejected claims 26-33 under 35 U.S.C. 112, first paragraph, citing that the specification does not reasonably enable the claims. The Examiner has indicated that claims 26-33 are so broad as to encompass any polypeptide having 70% or 90% identity to the polypeptide SEQ ID NO 3, 4, and 5, or 1. The Examiner has taken the position that amino acid information regarding tolerance to modification for GH5 is not provided, and thus, the specification is not enabling to the broad scope of the claims. Applicants respectively disagree with the Examiner's position. The attached excerpt from CAZy shows a variety of sequences from the GH5, CBDIII and CBDII families. It is entirely within the ordinary skill in the art to compare these sequences for homology, pick materials that fall within the scope of the claims, and assemble them in the order that is claimed. Furthermore, site-directed mutagenesis and computer modeling may be used to predict the effect of sequence changes, for example, as described in the specification in the passage from page 20 at line 27 to page 21 at line 5. No undue experimentation is required to produce these results.

Rejections under 35 U.S.C. §102:

The Examiner has rejected claims 1-5 under 35 U.S.C. §102 as being anticipated by Gibbs et al. Page 15 of the office action imposes upon Applicants the burden of refuting the Examiner's assumption; however, it is refuted on the face of Gibbs for the reasons explained above. The accompanying Rule 132 Declaration of Dr. Ding shows that Gibbs presents a sequence of GH5-CBDII-CBDII. Therefore, claims 1-5 cannot be anticipated where the claims recite GH5-CBDIII-CBDII. This cannot now be the case where amended claim 1 specifically refers to SEQ ID NO. 3. Furthermore, the Examiner assumes that Gibbs discloses CBDIII and CBDII binding sequences, respectively, of 140 to 160 and 90-110 amino acid residues. This is not the case where, in FIG. 1 of Gibbs, the second CBDII domain comprises 123 residues.

The Examiner has rejected claim 26 as being anticipated by Himmel et al. because Himmel et al. disclosed an amino acid sequence that is more than 70% identical to SEQ ID NO 5. Claim 26 has been amended to claim a polypeptide molecule that is useful for degrading mannose. The scope for claim 26 is thus limited to mannanase type polypeptides. The sequence pointed out by the Examiner shows a different enzyme that s not a functional mannase. Withdrawal of the rejection under 35 U.S.C. 102(a) is therefore requested.

Rejections under 35 U.S.C. §103:

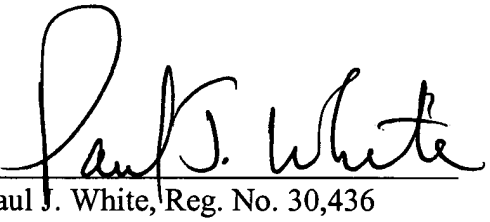
The Examiner has also rejected claim 12 as being unpatentable over Gibbs et al. and in view of Liu et al. (US 6,126, 698).

Gibbs is used to show a mannase composition. Liu et al. '698 is used to show the use of mannase in detergents. Even if Gibbs and Liu et al are indiscriminately combined, they still fail to teach or suggest the composition of amended claim 1. Furthermore, there is no suggestion to modify either reference in a manner that describes the mannase composition of amended claim 1. Withdrawal of the rejection under 35 U.S.C. 103 is therefore requested.

As such, it is respectfully requested in accordance with the amendment of claims and the discussion above, that the rejection of the claims be reconsidered and all of the claims in the application be found allowable.

Applicants' attorney respectfully solicits a Notice of Allowance in this application. The Commissioner is authorized to charge any additionally required fees to deposit account 14-0460. Should the Examiner have any questions, comments, or suggestions that would expedite the prosecution of the present case to allowance, Applicants' representative, Paul White, earnestly requests a telephone call at (303) 384-7575.

Respectfully Submitted,



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